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the first row of (A)];  $1^2 + 6^2 + 10^2 + 18^2 = 461$ ,  $2^2 + 6^2 + 12^2 + 15^2 = 409$ ,  $3^2 + 7^2 + 13^2 + 17^2 = 516$ ,  $4^2 + 8^2 + 14^2 + 16^2 = 532$  [461, 409, 516 and 532 being the numbers in the first row of (B)].

We note above that the sum of the natural numbers not used in (A) is 25 and that 10 is used more than the usual number of times. Similarly in (B) the numbers 25 and 6 are exceptional numbers. Were we inclined to be superstitious we might therefore say that October 25 (10-25) and June 25 (6-25) are dates of transcendent importance in 1918, say, the date of the signing of the treaty of peace, and the date of cessation of fighting in the world war.

## UNDERGRADUATE MATHEMATICS CLUBS.

EDITED BY R. C. ARCHIBALD, Brown University, Providence, R. I.

It is designed that this new department of the MONTHLY shall record the details of organization and activity of each undergraduate mathematics club in America, shall serve as a medium of communication between such clubs, and shall contain information helpful and suggestive for their guidance, and for the development of their usefulness.

As soon as the information can be collected a list of the clubs will be published. To 35 clubs already discovered appeal has been made for details, a portion of which will be given in connection with this list. It is earnestly desired that every other club shall make itself known to the editor, reporting on such things as: (1) the club's exact name, (2) the date (year and month) of organization, (3) the club's object and those eligible for membership, (4) the names of the officers of the club for 1917-18, (5) the number of members of the club, the average attendance, and the number of meetings held each year, (6) the dates of meetings in 1917-18, the titles of papers read and the names of the speakers. The editor would like to receive also copies of all printed programs for the current and earlier years.

### CLUB ACTIVITIES.

#### THE MATHEMATICS CLUB OF BROWN UNIVERSITY, 1917-18.

Membership is open: (1) to those who have had or are taking a course in analytic geometry; (2) to the members of the freshman class who win the prizes awarded in connection with the competitive examination on original problems in entrance mathematics; and (3) to mathematical students in the second semester of the freshman year who have attained to the higher honor grade in a mathematical course of the first semester. Average attendance: 52.

Chairman: Professor N. F. Davis.

Committee on Program: Professor R. G. D. Richardson, Marion R. Luther Gr., Mary I. Briggs '18, Clarence R. Adams '18, James B. Hobbs '18.

Committee on Arrangements: Doctor T. H. Brown, Lydia L. Cooper Gr., Esther E. Brintzenhoff '19, Albert S. Pratt '18, Chauncey D. Wentworth '20.

The program for the year 1917-18 is as follows:

- November 16: "Geometric Exercises in Paper Folding" by May Sperry '18;  
"Mathematical Fallacies" by Albert S. Pratt '18;  
December 14: "Growth and Form" by Mary I. Briggs '18; "Secrets of Lightning Calculators" by James B. Hobbs '18;  
January 11: "Nomography" by Professor E. V. Huntington of Harvard University;  
February 15: "Mathematics of Warfare" by Mary E. Carroll '19; "Probability Curves" by Clarence R. Adams '18; "The Development of Mathematical Symbolism" by Marion R. Luther Gr.;  
March 15: "The Russian Peasant Method of Multiplication and the Binary Scale of Notation" by Elsie M. Flint '18; "Non-Euclidean Geometry" by Professor H. P. Manning;  
April 19: "Some Philosophical and Psychological Implications of the Game of Nim" by E. B. Delabarre, Professor of Psychology in Brown University;  
May: Picnic.

#### THE JUNIOR MATHEMATICAL CLUB OF THE UNIVERSITY OF CHICAGO.

Professor Slaughter has kindly furnished most of the following notes:

"This club was organized by students in the autumn of 1905 chiefly through the instrumentality of N. J. Lennes who was then a graduate student at the university. Its purpose was to afford an opportunity to all students primarily interested in mathematics, whether undergraduates or graduates, to present before a sympathetic audience the results of reading and investigation, especially along lines not likely to be included in regular class work. The intention, for the most part well carried out, has been, and is, to keep these papers strictly elementary as compared with the papers presented in the Graduate Mathematical Club of the university where only the results of original research are given. In fact, the chief incentive to organizing this Junior Club was the great discouragement experienced by even the younger graduate students (not to mention the undergraduates) in trying to be interested and to look wise while attending the meetings of the Graduate Club.

"The meetings of the Junior Club occur every second week during the year from October to June, alternating with those of the Graduate Club. They rarely last for more than an hour and a quarter, the half hour preceding the presentation and discussion of papers being usually devoted to friendly intercourse encouraged by a cup of tea.

"The chief results of these meetings, looked at in perspective over a decade, are: (1) Accumulation of information by the members in many lines that they might otherwise not find time or inclination to look up for themselves; (2) stimulation to activity on the part of individuals who might otherwise be content to do the required class-room work and nothing more; (3) cultivation of independence in study, and ease and clearness in presenting the results of study to an audience; (4) preparation of students either for teaching or for further advanced study,

in many ways which would not otherwise be realized in the regular college and university work.

"The average number of members is somewhere between fifteen and twenty. There is no constitution and no requirement for membership other than a devotion to mathematics and a desire to commune with others having the same devotion. The minutes of the first meeting record that 'Professor Slaught was made an ex officio member with the power of veto' to make sure, I suppose, that things would go straight. I have almost always given the opening address at the autumn meeting.

"It may be of interest to add that the first president of the Junior Club was W. R. Longley, now professor at Yale, and that the first program committee included G. D. Birkhoff, now professor at Harvard, and Dr. H. F. McNeish, now of the De Witt Clinton High School, New York."

Officers, 1917-18: President, E. P. Lane; vice-president, C. Gouwens; secretary, Minna Schick.

The program committee consists of the officers and of I. A. Barnett, W. G. Simon and Gladys Gibbons.

All officers and members of the committee are graduate students.

The following is the program for the fall quarter, 1917:

October 12: Election of officers. "Purposes and Aims of the Club" by Professor Slaught.

October 24: "G. Cantor" by Minna Schick; "Notion of Number" by I. A. Barnett;

November 7: "Unique Factorization in the Quadratic Realm" by C. Gouwens;

November 21: "Finite Projective Geometries" by Cyril A. Nelson, Jr.;

December 5: "History of the Teaching of Collegiate Mathematics in the United States" by W. G. Simon.

#### THE MATHEMATICS CLUB OF THE UNIVERSITY OF KANSAS, 1917-18.

Membership is open only to those who have had a three-hour year course in calculus. Average attendance about 19.

Officers: President, Mildred Abel '18; vice-president, Eran Burgert '18; secretary, Frances Adams '18; faculty adviser, Professor U. G. Mitchell.

Program Committee: Helen Garman '18, Mary Smith '18, and Edward Buffington '18.

The program for 1917-18 is as follows:

October 8: "Air Planes" by Professor Lefschetz;

October 22: "Poincaré's Non-euclidean World" by Mildred Abel '18;

October 31: "Fortunes told mathematically" by Professor Van der Vries;

November 12: "The Number Zero" by Helen Wedd '18; "The Number  $\pi$ " by Beulah Armstrong Gr.;

November 26: "Feuerbach's Circle" by Mary Smith '18; "A Probability Machine" by Anna Marm Gr.;

December 10: "Mathematics of the War" by Eran Burgert '18;

- January 7: "Numerical Properties of Color and Sound" by Edward Buffington '18;
- January 21: "Mathematical Fallacies" by Sarah Bingham '18; "Card Tricks" by Edith Witcher '19;
- February 11: "Mathematics as a Fine Art" by Georgia Beebe '18; "Mathematical Accomplishments of Women" by Irma Leon '19;
- February 25: "History of Time Pieces" by Wealtha Babcock '19; "History of the Metric System" by Sadie Horsley Gr.;
- March 11: "Zeno's Paradoxes" by Frances Adams '18;
- March 25: "Addition and Subtraction by Logarithms" by E. B. Miller (Instructor);
- April 8: "Mathematicians who became Famous in other Fields" by J. H. Hoover Gr.;
- April 22: "Regular Polygons inscribable in a Circle" by Goldie Piper '19;
- May 12: "The Beginnings of Higher Mathematics in England" by Faye Doddridge '19; "The Beginnings of Mathematics in the United States" by Helen Garman '18;
- May 26: Annual Picnic.

#### TOPICS FOR CLUB PROGRAMS.

##### 1. THE OLDEST MATHEMATICAL WORK EXTANT.

This is the heiratic papyrus said to have been one of a number found at Thebes in the ruins of a small building near the Ramesseum. It was purchased at Luxor in 1858 by A. Henry Rhind and after his death it passed into the hands of a gentleman from whom it was purchased by the trustees of the British Museum in 1864.

The papyrus was copied by a scribe named Ahmes, between 2000 B. C. and 1700 B. C., from an older work. The text comprises a series of propositions or problems in arithmetic, mensuration, trigonometry, and in the various branches of practical geometry, sometimes accompanied by diagrams, representing the class of practical mathematical knowledge which an overseer of royal farms, or a revenue officer or the master-mason employed in building a pyramid or temple, would be expected to possess.

Any approximately complete bibliography of the papyrus should contain more than forty titles. Three may be regarded as referring to works which are fundamental in connection with its study. These are: (1) The facsimile in original colors published by the British Museum in 1898 (21 plates, 15 x 25 in.) with a preface from which most of the details mentioned above have been taken; (2) the translation into German, and commentary, prepared by the Heidelberg aegyptologist August Eisenlohr with the aid of two mathematicians, his brother Friedrich and Moritz Cantor; the second edition, without plates (a work in quarto format of nearly 300 pages), published by Hinrich's Buchhandlung in Leipzig under the title: *Ein mathematisches Handbuch der alten Aegypter (Papyrus Rhind des British Museum)*; (3) the discussion of Eisenlohr's

work by L. RODET, "Les prétendus problèmes d'algèbre du Manuel du Calculateur égyptien," in *Journal asiatique*, Paris, 1881-82, série 7, tome 18; these articles were reprinted in 1882 (122 pages).

Three references may be given to historical works: (1) M. CANTOR, *Vorlesungen über Geschichte der Mathematik*, Band I, 3. Auflage, Leipzig, Teubner, 1907, pages 57 ff.; (2) S. GÜNTHER, *Geschichte der Mathematik*, I. Teil, Leipzig, Göschen, 1908, pages 24-35; (3) W. T. SEDGWICK and H. W. TYLER, *A Short History of Science*, New York, Macmillan, 1917, pp. 30-34.

In English there are also the papers by (1) F. L. GRIFFITH, in *Proceedings of the Society of Biblical Archaeology*, London, volumes 13 and 16, 1891, and 1894; and (2) G. A. MILLER, in *School Science and Mathematics*, Chicago, volume 5, 1905.

In French: (1) V. V. BOBYNIN, (a) "Sur le procédé employé dans le papyrus Rhind pour réduire les fractions en quantités," *Bibliotheca Mathematica*, Leipzig, 2. Reihe, Band 4, 1890; (b) "Méthode expérimentale dans la science des nombres et principaux résultats obtenus," *L'Enseignement Mathématique*, Paris-Genève, tome 8, 1906; (2) G. MILHAUD, *Nouvelles études sur l'histoire de la pensée scientifique*, Paris, Alcan, 1911, pp. 58-66; (3) L. BRUNSCHVIG, *Les étapes de la philosophie mathématique*, Paris, Alcan, 1912, pp. 26-32.

## 2. GEOMETROGRAPHY AND OTHER METHODS OF MEASUREMENT OF GEOMETRICAL CONSTRUCTIONS.

As far back as 1833 Steiner wrote a passage, often quoted, regarding the desirability of an investigation as to the simplicity and exactitude of geometric constructions;<sup>1</sup> but it is only within the past thirty years that theories along these lines have been developed.

Geometrography may be defined, in the words of its inventor Émile Lemoine (1840-1912), as "the art of geometrical constructions." Its aim is to discover which of the various ways of solving a problem is the simplest, or, in other words, which way requires us to perform the smallest number of operations.

Lemoine's first memoir on the subject was read before the French Association for the Advancement of Science in 1888 and during the next twenty years he published more than thirty papers and notes on the subject. The theory is pretty well summed up in his little book: *Géométrie ou art des constructions géométriques* (Scientia no. 18). Paris, Gauthier-Villars, 1902.

Reference may also be given to: (1) Lemoine's papers on a geometrographic comparison of twelve constructions deduced from eleven solutions of the same problem in *Comptes rendus de l'Association Française pour l'Avancement des Sciences*, 1899 and 1900; to (2) Lemoine's revision of Note IV, "Sur la géométrie," pages 517-548 of ROUCHÉ et COMBEROUSSE, *Traité de géométrie*, tome I, 8e éd., Paris, Gauthier-Villars, 1912; to (3) E. HAENTZSCHEL, "De l'exactitude des constructions géométriques," *L'Enseignement Mathématique*, tome 9, 1907,

<sup>1</sup> *Die geometrischen Constructionen ausgeführt mittelst der Geraden Linie und eines festen Kreises*, Berlin, 1833, § 19.

pp. 45-51; and to (4) recent volumes of *Zeitschrift für mathematischen und naturwissenschaftlichen Unterricht*, which had a department, under the editorship of K. Hagge, devoted to the discussion of problems in geometrography.

For extension of the considerations to space, see Lemoine's papers: (1) "La géométrie dans l'espace," *Comptes rendus de l'Académie des Sciences*, Paris, vol. 131, 1900; (2) "Géométrie dans l'espace ou stéréométrie," *Comptes rendus de l'Association Française pour l'Avancement des Sciences*, 1900.

Among English writings the following may be noted: (1) J. S. MACKAY, "The Geometrography of Euclid's Problems," *Proceedings of the Edinburgh Mathematical Society*, vol. 12, 1894, pp. 2-16; (2) J. L. COOLIDGE, *A Treatise on the Circle and the Sphere*, Oxford, Clarendon Press, 1916, pp. 166-179; (3) H. P. HUDSON, *Ruler and Compasses*, London, Longmans, 1916, pp. 112-117; (4) C. E. YOUNGMAN, "On Two Constructions for the Regular 17-Side," *Mathematical Questions and Solutions from "The Educational Times"*, new series, vol. 10, 1906, pp. 55-56; and (5) R. F. MUIRHEAD, "Constructions with Straight-edge and Dividers," *Mathematical Gazette*, London, 1905, vol. 3, pp. 209-211.

Other systems of measurement are described in A. GRÜTTNER, *Die Grundlagen der Geometrographie*, Leipzig, Quelle und Meyer, 1912; in K. ROHN und E. PAPPERITZ, *Lehrbuch der darstellenden Geometrie*, Band I, 4. Auflage, Leipzig, Veit, 1913, pp. 486-493 and 501-502; and in *Encyklopädie der mathematischen Wissenschaften*, Band III1, Heft 4, Leipzig, Teubner, 1910, pp. 528-531.

The issue of the MONTHLY for February, 1896, contained a portrait of Lemoine and a biographical sketch by D. E. Smith. Reference is made to the influence which he exerted in the realm of music through his celebrated soirées, "La Trompette." (Cf. L. AUGÉ DE LASSUS, *La Trompette. Un demi-siècle de musique de chambre*. Paris, Delagrave, 1911.)

## NOTES AND NEWS.

EDITED BY D. A. ROTHROCK, Indiana University, Bloomington, Ind.

Mr. D. R. BELCHER has been appointed instructor in mathematics at Adelbert College, Western Reserve University.

At Syracuse University, Associate Professor F. F. DECKER has been promoted to a professorship of mathematics, and Dr. J. L. JONES has been promoted to an assistant professorship.

Following the death of President P. W. McREYNOLDS, of Defiance College, Defiance, O., Professor A. G. CARIS, of the department of mathematics, was made acting president of the College.

At the University of Maine, Mr. M. F. JORDAN and Mr. Q. STAUFFER have been appointed instructors in mathematics; the department of mathematics has united with the military department in offering courses in navigation.